CONSTRUCTION BLUEPRINT

Module 9

Collaboration and Communications

Energy Efficiency for Construction

24 partners

12 countries

Date of Event

*Author/ **Institute***

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Collaboration and Communication | Summary

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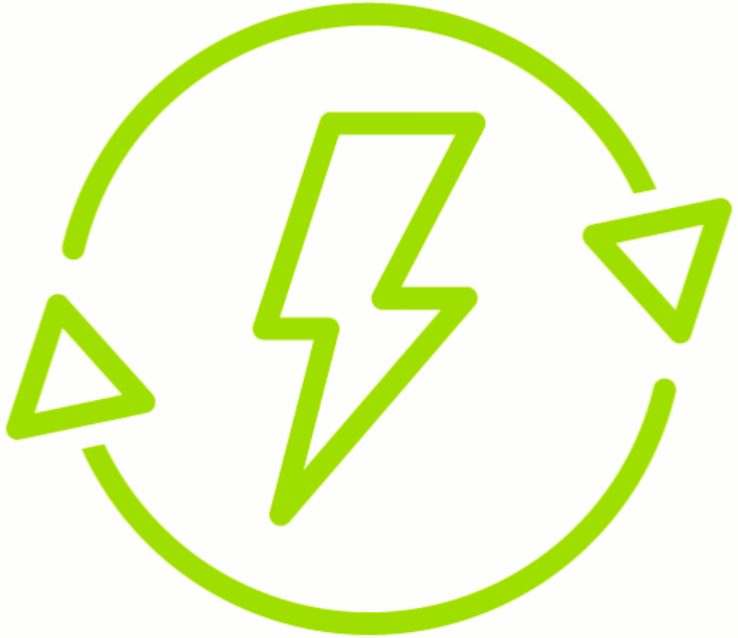
To equip the learner with the relevant knowledge and skills required to understand the importance of working together onsite to achieve quality NZEB buildings, communicate effectively and transfer information.



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Collaboration and Communication | Objectives

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- Understand the importance of working together onsite as a team (**System Thinking**) to achieve quality NZEB buildings
- Outline how different people at different times are **responsible** for executing and managing certain aspects or elements of construction to ensure quality, energy efficient healthy construction.
- Identify and demonstrate how **poor workmanship can impact** the energy performance of a building
- Outline the principles of quality building and the **correct sequence of works** to construct energy efficient healthy buildings.
- Understand the importance of **data management** and cybersecurity within projects
- Outline how **good communication** can help to create NZEB buildings
- Outline the importance of effective **transfer of knowledge** in all phases of build
- Outline the broad **training provision** for building construction workers and the tasks associated with each of their individual disciplines and importance of continuing skills development
- Demonstrate when and how **mentorship** is implemented on site to best practice

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Collaboration and Communication | Content

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Topic 1 – Roles and Responsibilities

Topic 2 – System Thinking

Topic 3 – Knowledge Transfer

On some of the following slides you will see this icon:

Click and play to find out more

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1. Roles and Responsibilities

Communication and Responsibilities

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- It is essential that **all trades communicate** well with each other on site and understand their roles. Being organised is part of working in a team.
- This topic will introduce a number of Mobile Apps that can help improve **communication, problem solving workflows** and knowledge transfer throughout the construction chain and in particular for on site works.
- Information can also be stored and transferred easily to clients, building owners and occupants of the building.

RACI matrix example

R	Responsible
A	Accountable
C	Consulted
I	Informed

Project Activity / Deliverable	Project Manager	Consultant	Architect	Contractor	Client
Define functional and aesthetic needs	I	I	C	I	R
Assess risk	A	R	I	C	I
Define performance requirements	A	R	I	I	I
Create design	A	C	R	I	C
Execute construction	A	C	C	R	I
Approve construction work	I	I	C	C	R

Deliverable	Project Manager	Technical Lead	Architect	HVAC Contractor	Electrical Contractor	Client
Approved Project Brief	AR	C				C
Approved Project Plan	AR	C	I			I
Completed Requirements	A	C	R	I	I	C
Approved Drawings	A	C	R	C	C	C
Completed Site Survey	A	R	I	C	C	I

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Team approach to achieve NZEB

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NZEB buildings require

- innovative design processes
- mixtures of technologies
- integrated design approach
- constructed by work teams

Collaboration is essential between architects, engineers, technical experts, building managers, site supervisors, **construction workers** and building clients to achieve NZEB compliance and Quality of works.

Team approach to achieve NZEB

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If the **Key Team** are involved from the earliest practical moment:

- Decision making in the early stages by ALL Key Players will improve Quality and time frame of the build
- Combined knowledge and expertise by ALL key players during the project's early stages will set out roles and responsibilities to improve production.
- This means the Client, Design Team, Main Contractors and Specialists.

Responsibility and System thinking

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Everyone who is involved in the building design, construction, maintenance and usage need to know their own and each other's roles in the building's life cycle in order to achieve an Energy Efficient building.

Achieving the expected environmental performance and energy efficiency is a common responsibility of everyone involved.
A **System Thinking** approach is necessary.

This requires a high level of collaboration, with an effective workflow of information providing higher accuracy.

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2. System Thinking

Collaboration and System Thinking

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Reach people faster

Waste less time switching context

There are now many Systems Thinking collaborative tools that can help construction workers on site.

Interactive communication tools to allow for better organization by the team and the individual.

Give projects a dedicated channel, not endless email chains

Ensure Teams Stay looped in, not out

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System Thinking

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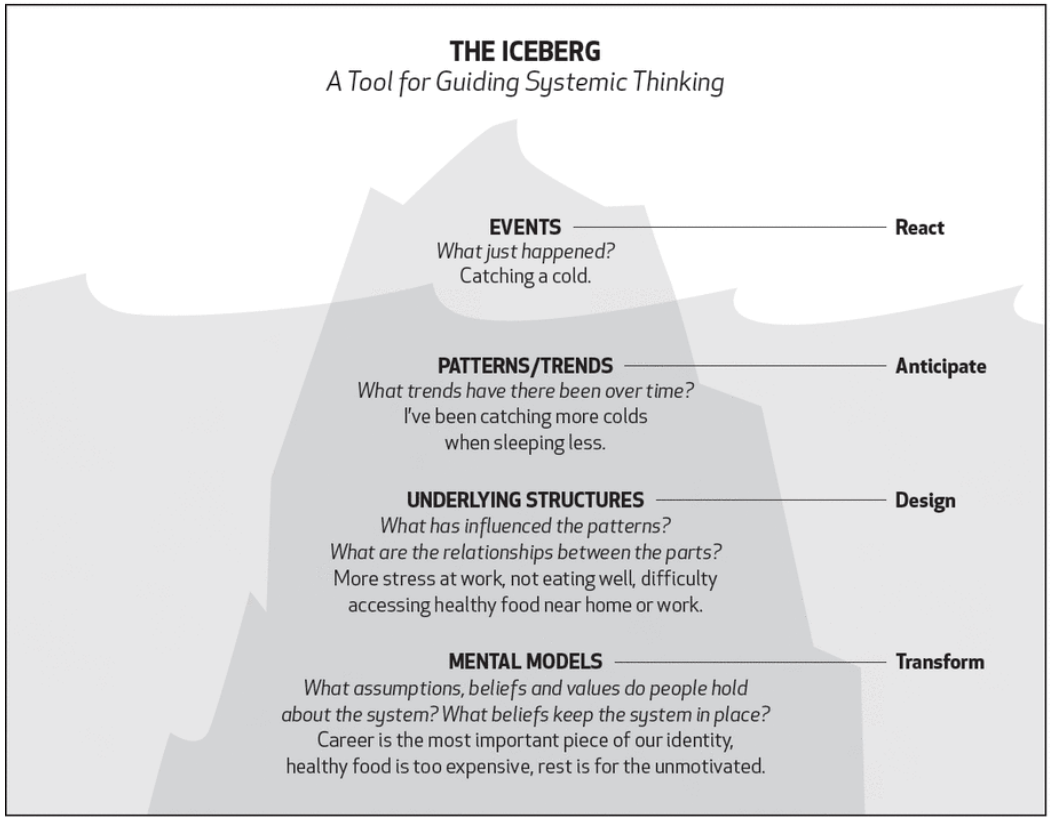
<u>Systems Thinking</u>: 'an approach to building that focuses on the importance of collaboration and communication between all workers onsite to ensure a quality, high performing end product'

Systems Thinking involves:
Consideration of all trades and their works - Working together

- Listening and Talking - Good Instructions and communication
- How other trades work - Awareness

A key element of systems thinking is to understand **how your own work will affect the works of others** and how important it is to communicate and changes amongst yourselves. The approach also considers how each individual affects the outcome of the final build and the standards that it achieves.

"who asks a question is a fool for five minutes; who does not ask a question remains a fool forever"



https://www.linkedin.com/pulse/systems-thinking-detailed-overview-duane-banks/

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Team Approach to NZEB

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- Meeting NZEB in a cost-effective manner requires teamwork
- Example – airtightness depends on everyone working towards the same goal
- Also – continuity of insulation and avoiding thermal bridges
- Communication is vital – especially with trades that make penetrations (electricians and plumbers)
- This is “System Thinking”

Image Source: Left and Right – MosArt / Middle Purchased by TUS (QualiBuild)

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Explain Key Sequences – Especially Airtightness

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Example:

1. Seal all windows and doors to their surrounds following designers specifications.
2. Ensure membranes or airtight boards are securely in place with all joints taped and connections to surrounds are sealed.
3. Seal all service penetrations.
4. Run 1st air tightness test to ascertain level of air permeability. It is critical to run this first test whilst all parts of the airtight layer are accessible. Find and seal leaks during this 1st test.
5. Continue with project, ensuring that all penetrations are sealed by competent persons.
6. Run 2nd airtightness test on project completion.

Key Project Aspects that Require Excellent Communication On-Site

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Delivering next generation energy efficient, comfortable and healthy homes will require a coordinated team effort:

- Continuous thermal insulation layer
- Uninterrupted vapour control and airtightness layer
- Minimal thermal bridging
- Optimised ventilation provision

If your work on-site is impacting adversely on any of the above aspects, tell someone!

Airtightness and Vapour Control Strategy

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Before you commence work on-site, consult with the site supervisor on the following:

- **What materials are being used** for airtightness and vapour control (membranes, plaster, liquid applied, panels, combination)?
- Is there an **airtightness 'champion'** on the project who will seal all penetrations, or do individual trades take responsibility?
- Will there be a **service cavity** in the walls and ceiling?
- What kind of **openings are planned for key services** such as metre boxes, telecoms, broadband, water, waste?
- Are there plans for **pre-fabricated elements** on the project?
- Are there plans for **intermediate air permeability tests**, or just one test at the end?
- What is the air **permeability target** for the project (irrespective of the number, all trades must deliver best practice) ?

Airtightness and Vapour Control – Take Responsibility

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You will have learned about the importance of airtightness and vapour control throughout this training programme:

- Ask for help when needed – **never 'cover-up' shoddy workmanship** hoping it will go unnoticed
- If **specialist expertise** is required for specific junctions or penetrations, tell the supervisor
- If you feel **inferior materials** are being used on the project, say something!
- If you **don't understand or agree with a proposed detail** or specification, discuss with the site supervisor
- **Share your knowledge** with others on-site – explain not just <u>how</u> to seal something, but <u>why</u> it is so important

Quality Assurance On-site – Airtightness and Vapour Control

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You notice that a contractor has run out of airtight tape and is using duct-tape to seal a penetration in the bathroom. He is being very careful in ensuring an excellent connection all around the pipe, and the end result looks very neat.

What do you in this situation?

- ☒ Pay him a compliment on his attention to detail?
- ☒ Reassure yourself that his approach will probably be airtight for the test that is planned for later in the week?
- ☒ Ignore it – you've enough to be doing!
- ☒ Make fun of his work to others later on in the canteen?
- ☺ Tactfully explain that whilst the seal might pass an airtightness test, it will likely fail over time and will leak a lot of vapor in a critical room?

Checking Quality of Materials

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Each trade must take responsibility for checking that the materials being used on the project match the Architects specification and are fit for purpose.

Examples below:

- **Product grade**, for example timber, blocks, concrete…
- **Insulation:** thermal conductivity, thickness, suitability for proposed application
- **Airtightness and vapour control**: must be fit for purpose (no sheets of plastic, no duct tape, no general DIY caulk
- **Thermal bridging:** conductivity, dimensions, structural suitability
- **Windows:** g-value for each position, U-value of glass, U-value of frame, seals for airtightness
- **Ventilation:** dimensions of fittings, quality of seals and connectors, equipment type (intermittent fans, CMEV, MVHR, DCV)

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3. Knowledge Transfer

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Maintenance and Operation Handbook

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An operations and maintenance handbook should be provided to the site supervisor to ensure the homeowner understands how to operate their home in an energy efficient manner.

Some examples are provided below:

- **Ventilation:** critical importance of changing filters!!!, general overview of how to operate the system, importance of not tampering with the commissioned system (block openings, adjust valves, switch off equipment, change fan speeds, fill gaps under doors
- **Solar renewable energy**: description of the system (thermal / electric), maintenance (cleaning, charging with glycol), safety shut-off (whether valve or isolator switch)
- **Heating and hot water:** description of generator (boiler, heat pump), set point temperatures, location of thermostats, controls for temperature, time and zone, maintenance requirements
- **Airtightness and vapour control:** materials used and importance of sealing future penetrations with appropriate materials
- **Lighting:** bulbs used, lumens provided, colour used

Communication with Homeowners – Real life Situations

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Solar PV Shut-Off

A homeowner with ‘busy fingers’ inadvertently hit the isolator switch on the PV system and missed out on a full year of free solar electricity.

Blocking Background Ventilators

A homeowner was bothered by noise and draughts from background ventilators and blocked them up. Soon after, they had problems with mould & condensation.

Filter Changing

Homeowner complained the house was stuffy & there was poor extract from the bathroom and kitchen. On checking, the filters hadn’t been changed for 2 years

Poor Communication! These situations (and others) could have been avoided with a detailed walk-through with the homeowner

Advice Regarding Alterations and Extensions

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A summary specification of the building envelope and building services should be provided to homeowner to assist them if extending or making alterations:

- **Insulation:** thicknesses and materials used
- **Airtightness and vapour control:** how best to ensure continuity with the existing thermal envelope
- **Thermal bridging:** critical junctions and penetrations for avoidance of mould
- **Windows:** performance specification on each aspect of the window
- **Ventilation:** system capacity and overview, flow rates, duct dimensions, air transfer gaps and lot more
- **Heating and hot water:** capacity of heat generator, location of thermostats and controls, pipe diameters and insulation levels

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Thank You

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